Tokyo, Japan 7 August 2003

SOURCE[1]: ST Microelectronics

TITLE: Does VDSL from the CO make sense?

ABSTRACT

This contribution shows that if we look at the requirements of next generation applications served from the CO, VDSL is the best candidate, and as such need to be considered by the TTC as the physical layer for high rate applications from the CO.

1 Introduction

The way the TTC decide on spectral compatibility is based on the spectral compatibility with services that are already deployed from the CO.
These days we are trying to define spectral masks for new high rate services. As this new services use much wider spectrum than existing services we need to try and look around the corner and forecast what will be the next step.
As Japan is proven to be the most demanding customer for broadband high rates new services we should not only try to anticipate these services we should also try to protect them.

Current use of VDSL in Japan only for very short loops and not from the CO, created the perception that VDSL is not a candidate for deployment from the CO.

In these days we consider deployment of high rate services based on technologies like ADSL++ from the CO. As one CO can give service to houses located at short distances and at long distances at the same time, an important criterion for usability of a service is loop coverage which is tightly linked to reach.

Considering this criterion, the following simulation shows that VDSL not only offers us better reach for the already discussed services (e.g. 24M DS /1M US) but also open the door for a whole new spectrum of services with reasonable loop coverage (e.g. 10Mbps symmetric up to 750m) .

2 Simulation environment

The following rate-reach graphs are based on the following assumptions:

1. ANSI psd mask for VDSL, where ADSL++ uses VDSL mask upto 3.75MHz.
2. 14.5dBm for VDSL , while 20.5dBm for ADSL++.
3. The loops used are 0.4mm polyethylene based on G.996.1 Japanese model.
4. The cross talk model used is based on NTT measurements and has been certified by the Soumusho [1] and cited by Globespan Virata [2]. The case used is 5 distributers , 1 intra quad and 4 inter quad (NEXT coupling –50dB and FEXT coupling –51.5dB. Both at 160KHz,1Km)
5. –140dBm/Hz noise floor.

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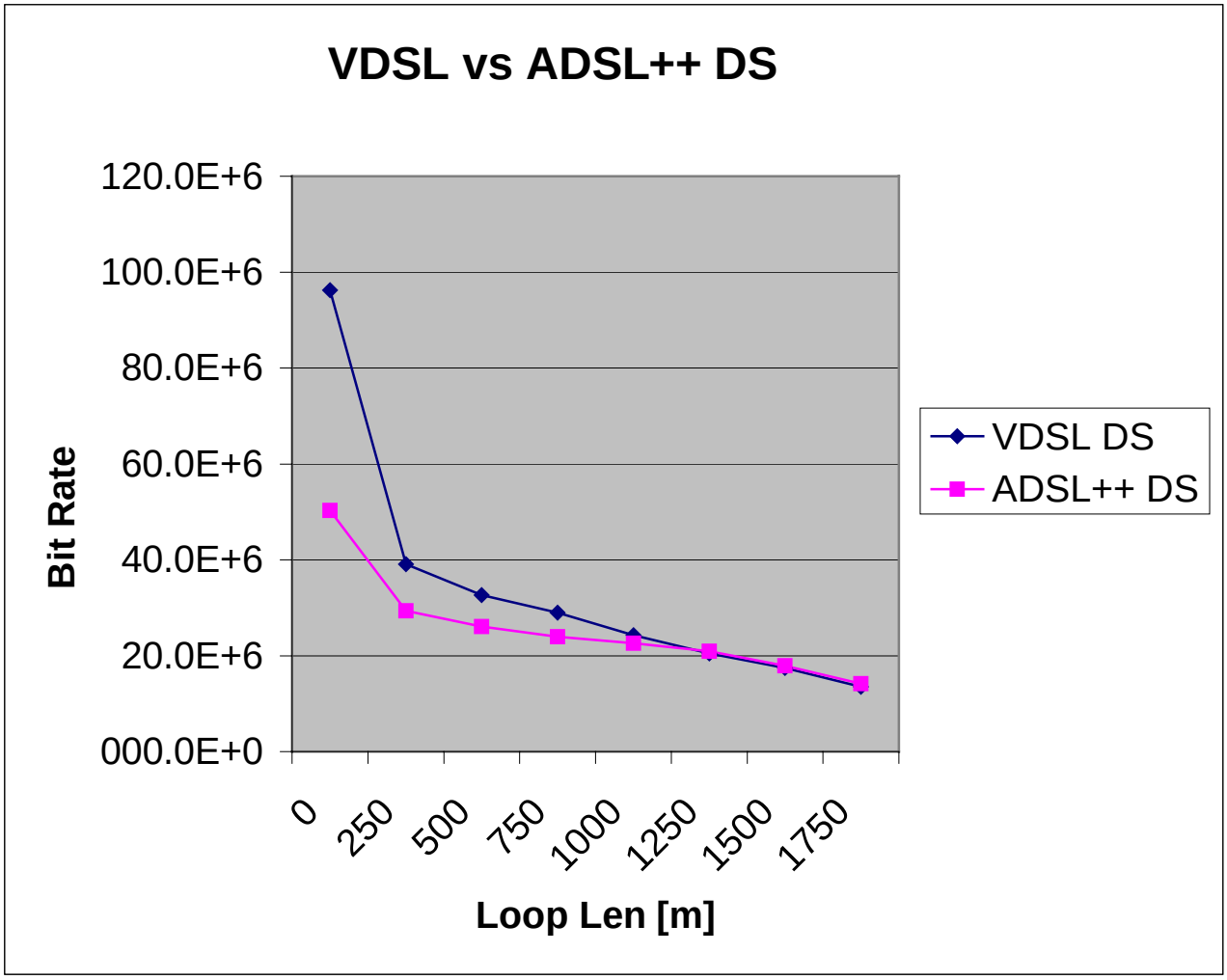
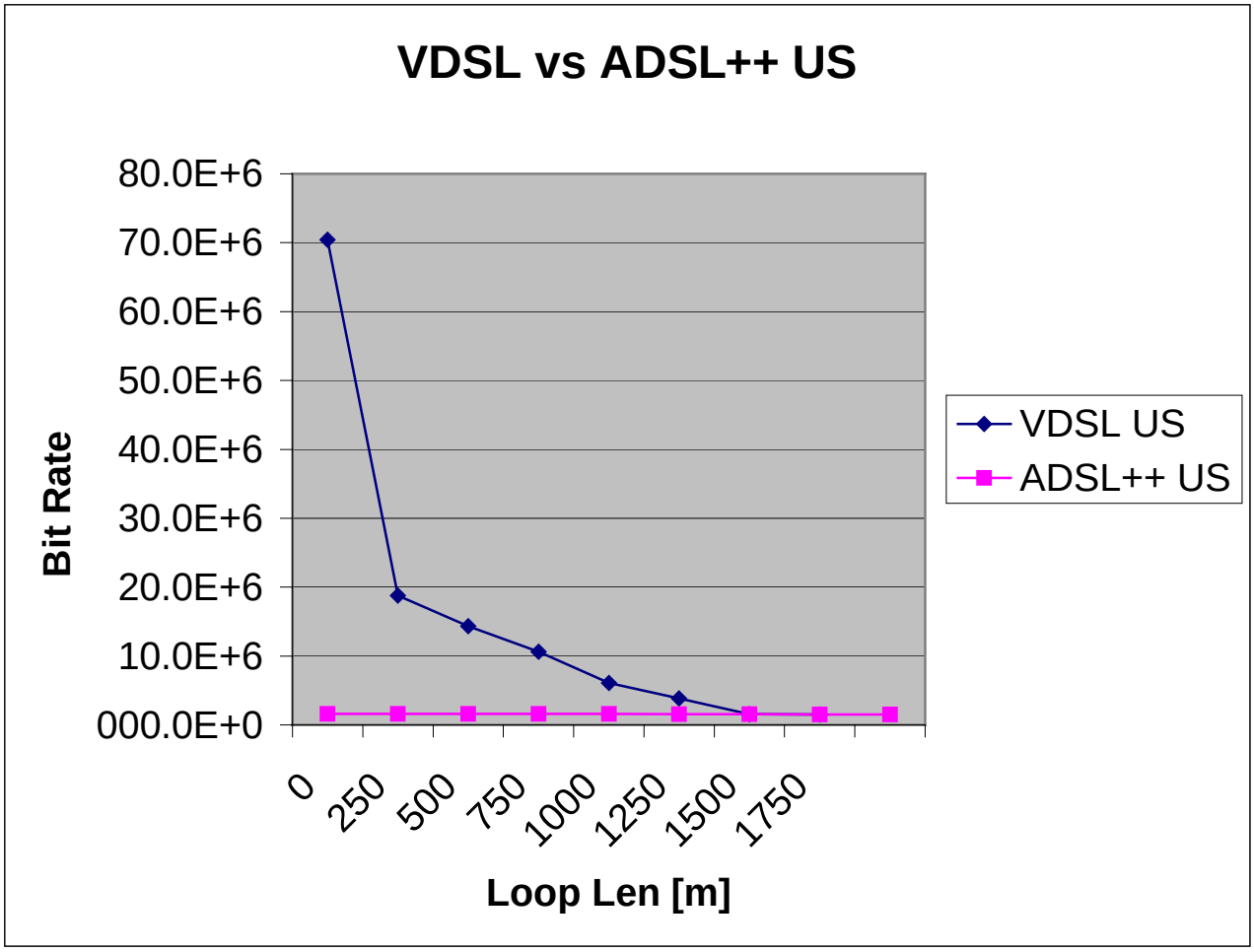
6. Coding gain for ADSL++ 5dB , for VDSL 3.8dB
7. Margin 6dB
8. Implementation loss 2dB
9. Loading in the range 1-15.

3 Rate Reach

Looking at the following graphs we can see that in realistic self FEXT limited environment VDSL offers considerably better reach for the high rates asymmetric services. We can also see that VDSL can offer high rate symmetric services with reasonable reach.




VDSL vs ADSL++ US
80.0E+6
70.0E+6
60.0E+6
50.0E+6
40.0E+6
30.0E+6
20.0E+6
10.0E+6
000.0E+0
Bit Rate
0
250
500
750
1000
1250
1500
1750
Loop Len [m]
VDSL US
ADSL++ US